

What are weather radar?

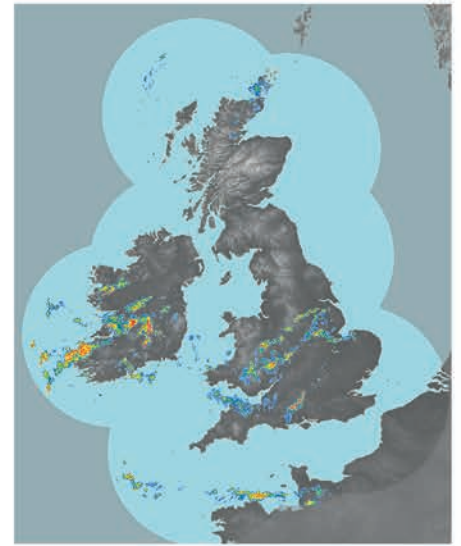
Weather radars observe rain, hail and snow and their doppler radar functions are also used for the detection of dangerous wind conditions (e.g. wind shear) that constitute a significant hazard to aviation safety. Rainfall radar observations are used directly by weather forecasters, and are fed into forecast models.

Weather radars provide a unique method of obtaining widespread, spatially continuous measurements of precipitation location and intensity at scales of hundreds of metres.

The weather radar network was gradually built up from the mid 1970's. Today the Met Office operates 15 of the 18 radars, that give continuous coverage of the British Isles.

The network was recently renewed with brand new hardware, software and communications, to avoid obsolescence and to improve data collection. This included the amount and type of data that could be collected and used, in both real time reporting and to meet the future demands of higher resolution Numerical Weather Prediction models to improve forecast accuracy.

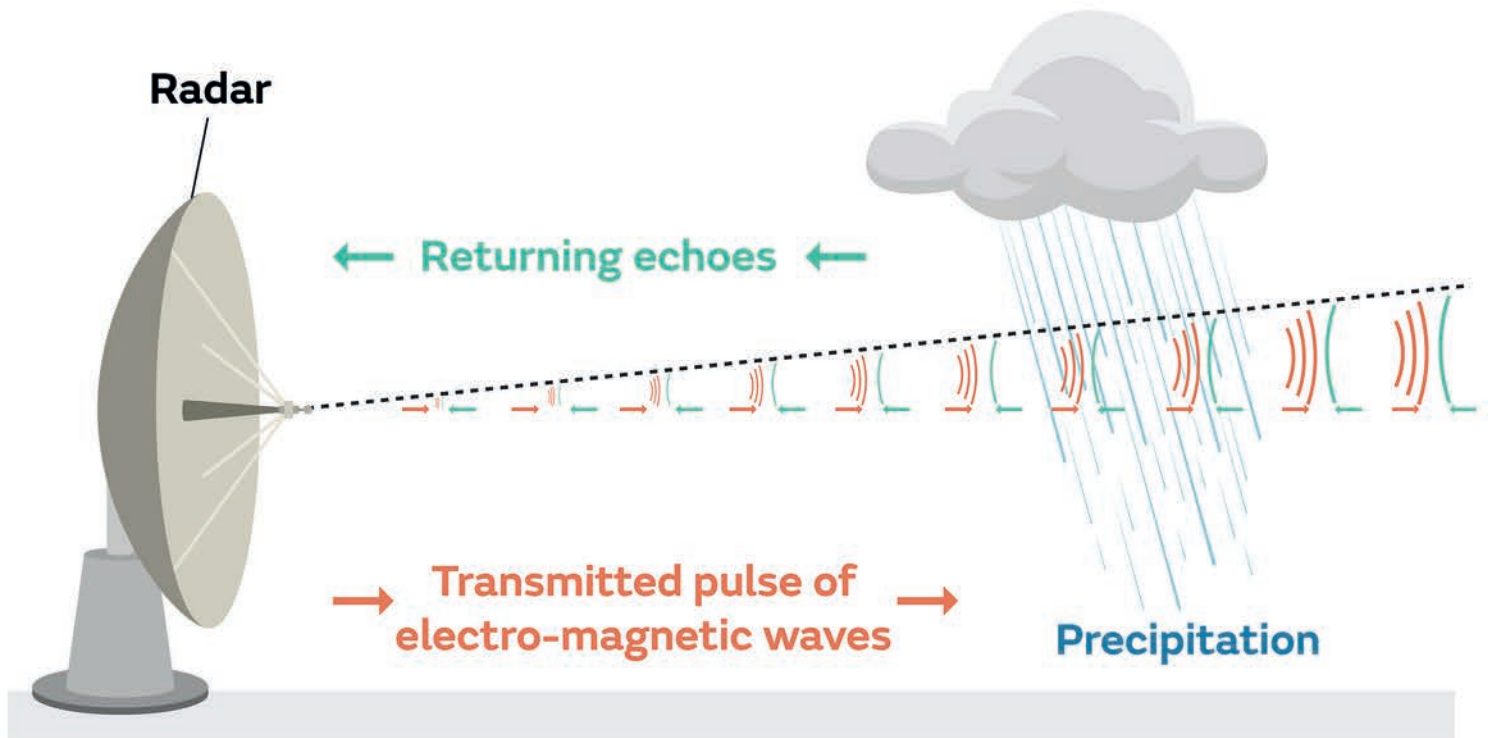
In the areas of aviation and flood forecasting (in partnership with the Environment Agency in England, Natural Resource Wales in Wales and the Scottish Environmental Protection Agency in Scotland) they are crucial for the protection of life and property.



How does a weather radar work?

Each radar sends out pulses of microwave radiation and detects the return signals reflected by particles of precipitation, whether liquid or frozen. A weather radar sends out a pulse at a wavelength of 5.6 cm. The return signal is detected, then compared to a number of rain gauges on the ground and adjusted accordingly to give a measure of precipitation.

The strength of the return signal may be used to estimate precipitation intensity, and its delay is a measure of distance from the radar site. The radar generates circular measurement maps by rotating through a full 360 degrees in azimuth, while transmitting pulses concentrated in a narrow beam. Several of these 'scans' are taken at a number of low elevation angles above the horizon. A scanning cycle takes 5 minutes providing data out to 255 km from the site, with a resolution up to 1 km.



RADAR = Radio Detection And Ranging